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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
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| 09/121,528 | 07/23/98 | DERDERIAN G | M4065.069/P0 |

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| **ART UNIT** | **PAPER NUMBER** |
| 1762 | |

**DATE MAILED:** 04/21/99

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

| Office Action Summary | Application No. 09/121,528 | Applicant(s) Derderian |
|---|---|---|
| | Examiner Timothy Meeks | Group Art Unit 1762 |

☐ Responsive to communication(s) filed on _____.

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

**Disposition of Claims**

☒ Claim(s) *1-45* is/are pending in the application.

Of the above, claim(s) *37-45* is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-36* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☒ Claims *1-45* are subject to restriction or election requirement.

**Application Papers**

☒ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐approved ☐disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

**Attachment(s)**

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 2

☐ Interview Summary, PTO-413

☒ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

*--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---*

## DETAILED ACTION

### *Election/Restriction*

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-36, drawn to methods, classified in class 427, subclass 252.

II. Claims 37-45, drawn to capacitors, classified in class 257, subclass 499+.

The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the platinum layers could be made by a materially different process such as evaporation or sputtering without an oxygen and nitrous oxide atmosphere.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with James Silbermann on April 13, 1999 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-36. Affirmation of this election must be made by applicant in replying to this Office action. Claims 37-45 are

withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### *Drawings*

This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.

### *Claim Objections*

Claims 8, 9, 20, 21, and 25-28 are objected to because of the following informalities: In claims 8, 9, 25, and 26, one of the spelled out "methylcyclopentadienyl trimethylplatinum" or the chemical formula should be used, but not both. In claims 20, 21, 27, and 28, "BPSG" and "PSG" should be spelled out. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 20 and 25-36 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 20 and 27, the Markush group is confusing in that it claims several overlapping species. For instance, "BPSG" and "PSG" are "oxides" and "Si" is inclusive of "polysilicon".

In claim 25, the term "good step coverage" is vague and indefinite as the word "good" is relative and the claim, the specification, nor the prior art provides a definition with which to reasonably ascertain the scope of the term.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al. (5,783,716).

Baum et al. disclose a process for depositing platinum films comprising providing a precursor such as methylcyclopentadienyl trimethylplatinum to a chamber containing a substrate, along with an oxidizing gas, such as oxygen and nitrous oxide mixtures, and depositing the platinum film on a substrate at 200-300 C, said platinum film being useful for an electrode for DRAM (Example 6). The claimed substrates are disclosed at col. 7, lines 52-63.

With respect to claims 1-5, Baum et al. do not explicitly disclose having the gas mixture at a predetermined pressure. However, as it is very well known that pressure is a critical parameter

in CVD affecting deposition rates, etc., one would not have just blindly performed the process of Baum et al. without performing the reaction at a "predetermined" pressure. Therefore, it would have been obvious to have performed the process of Baum et al. at predetermined pressure of gas mixture because doing so would have been expected to be effective as opposed to blindly introducing gases into the chamber and not accounting for pressure in the process. With respect to the specified claimed pressure ranges, as established above, pressure is a result effective variable parameter. Therefore, adjustment of this result effective parameter through routine experimentation, including to values in the claimed ranges, would have been obvious absent evidence showing the criticality of using the claimed pressures.

With respect to claims 6-36, Baum et al. disclose that higher precursor delivery rates are achieved when delivering the precursor by direct liquid injection rather than by using conventional bubbler systems which involve delivering the precursor by bubbling a non-reactive gas therethrough. However, because Baum et al. disclose at col. 1, lines 40-68 that conventional bubbler systems provide sufficient precursor delivery rates unless it is desired to form larger area platinum films with continuous coverage of surfaces of various geometries, it would have been obvious to have used conventional bubblers for delivery of the precursors for applications other than that listed by Baum et al. as being inadequate given the expectation of such delivery system being adequate.

With respect to the claims requiring specified flow rates of inert gases for delivering the precursor, this clearly affects the amount of precursor delivered to the process which affects the

deposition rate, etc. Therefore, this is a result effective parameter and adjustment of this result effective parameter through routine experimentation for optimization would have been obvious absent evidence showing the criticality of using the claimed flow rates.

Likewise, Baum et al. are silent as to the deposition times and Pt film thicknesses. However, these parameters are clearly directly related and the thickness is a function of the intended purpose. Therefore, adjustment of these result effective parameters through routine experimentation for optimization would have been obvious, absent evidence showing the criticality of using the claimed values.

With respect to claims requiring certain ratios of oxygen to nitrous oxide, Baum et al. disclose that the purpose of the oxidizing gas is to remove carbon facilitate DRAM production (col. 5, lines 27-47) and the relative amounts of the oxidizing gases in the process would affect this result. As such variation of this result effective parameter through routine experimentation, including to values in the claimed range, for optimization would have been obvious absent evidence showing the criticality of using the claimed values.

Claims 6-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baum et al. in view of Kwon et al. (J. Electrochem. Soc.).

The teachings of Baum et al. are discussed above. Baum et al. differs from the claimed invention in that they use direct liquid injection rather than a conventional bubbler. However because Kwon et al. disclose that using a bubbler with argon inert carrier gas to deliver the same

platinum precursor as that used by Baum et al. is effective for depositing a platinum film for an electrode of a memory cell (abstract; experimental), it would have been obvious to use a bubbler to deliver the precursor of Example 6 of Baum et al. for forming an electrode for a memory cell because doing so would have been expected to be effective.

Baum et al. do not explicitly disclose a pressure. However, because they do not limit the pressure and because Kwon et al. disclose that a pressure of 2 Torr is effective for depositing a platinum film using the precursor of Example 6 of Baum et al., it would have been obvious to have used this pressure because it would have been expected to be effective. The other differences with respect to result effective parameters are obvious for the reasons set forth above.

Claims 1-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon et al. in view of Baum et al.

Kwon et al. disclose deposition of a platinum film as a bottom electrode of a memory cell comprising bubbling argon over methylcyclopentadienyl trimethylplatinum precursor to deliver it to a chamber having a substrate of silica/Si at 300-400C, providing oxygen into the chamber to remove carbon contamination, providing a chamber pressure of 2 Torr, and depositing the platinum film (abstract; Experimental).

Kwon et al. do not disclose including nitrous oxide with the oxygen. However, because Baum et al. disclose that including nitrous oxide/oxygen mixture with methylcyclopentadienyl trimethylplatinum is effective for providing a DRAM electrode and reduces carbon incorporation

(col. 5, lines 28-48 and example 6), it would have been obvious to have included nitrous oxide in the oxygen gas of Kwon et al. with the expectation of achieving the results discussed by Baum et al. The other differences with respect to result effective parameters are obvious for the reasons set forth above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy Meeks whose telephone number is (703) 308-3816. The examiner can normally be reached on Monday through Thursday from 6:30 am to 4:00 pm. The examiner can also be reached on alternate Fridays from 6:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck, can be reached on (703) 308-2333. The fax phone number for this Group is (703) 305-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Timothy Meeks
April 19, 1999
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